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RESIDUAL WASTES

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BY: Yellowstone-Tongue APO

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RESIDUAL WASTES

A variety of waste products are generated within the project area. This report will be restricted to those solid wastes that are toxic or otherwise potentially detrimental to the surface or subsurface water supplies.

Mine spoils will not be considered a waste material for the purpose of this report, as it is assumed that all mine spoils generated within the project area will be placed into the mined area as a reasonable substitute for the original geologic materials. Such mine wastes will be essentially identical in basic composition to the original materials, but their fragmentation and exposure to the air may increase the probability of undesirable solids being leached from them.

The report is divided into the following categories:

1. Household and commercial
2. Agricultural
3. Energy conversion
4. Municipal sludges
5. Radioactive
6. Hazardous

HOUSEHOLD AND COMMERCIAL WASTES

Much of the estimated 30 tons per day of waste generated in the project area is not disposed of in a properly operated sanitary landfill. Many rural property owners dispose of their solid wastes in a depression or gully out of sight of the house. Roadside dumps are still being used by some people, including highway crews collecting the trash from the roadside barrels.

The State Solid Waste Management Bureau (letter of 4/25/77)

has provided the following information on the status of the municipal "sanitary landfills":

As per your request, the following are known solid waste disposal sites in the six county area within the Yellowstone-Tongue A.P.O.

Custer County

Miles City - This site is owned by the city and is operated and maintained by a private contractor. The site location appears to be satisfactory as does the operation and maintenance of the site. There have been times when we have received burning complaints, but in the past few years the disposal methods observed were adequate.

Fallon County

Baker - This site is owned and operated by the City of Baker. Site location appears to be satisfactory. The operation and maintenance practices at the site have been irregular recently. Burning was observed as was inadequate covering. For some reason the operation and maintenance has slipped inasmuch as past inspections of the site have shown the operation and maintenance to be acceptable.

Plevna - It has been rumored that an old site is still receiving some solid waste. It is our understanding, however, that Plevna residents haul refuse to Baker.

Carter County

Ekalaka - The site is owned and operated by the Town of Ekalaka. Maintenance is infrequent and not acceptable. The site, if operated properly at its inception, would have been satisfactory. However, poor operation and maintenance practices in the past have made proper operation and maintenance difficult and expensive. The town has been advised to properly close the existing site and start fresh at another approved location.

Powder River County

Broadus - It is believed that this site is located on BLM ground and operated by the Town of Broadus. The site is located in a rather deep draw in which dumping occurs approximately 1/3 of the way down the draw, thus there is a potential for surface runoff to enter the dumping area. Past operations and maintenance practices have consisted of dumping and burning with little, if any, covering. It is our understanding that the town has now moved to the top of the draw and is operating and maintaining an approved disposal site. This has not been substantiated by inspection to this date.

Treasure County

Hysham - Ownership of the site is not known, however the city does operate and maintain it. It might be better to say they try to maintain it. The site is totally used up. There is no cover material available and as a result they must burn the dumped refuse. An alternate solid waste disposal program needs to be initiated. They may be involved in the Rosebud County plan which is explained later.

Rosebud County

Forsyth - Land is leased from a private owner and the city is responsible for operation and maintenance. The city is searching for a new site because the lease runs out in June of this year and it appears it will not be extended or renewed. Operation and maintenance practices could be improved to facilitate more effective and efficient covering. However, for the most part, operation and maintenance practices appear satisfactory.

Colstrip - Site is owned by Western Energy and operated and maintained by the Bechtel Power Company. We have had some problems in the past, however present operation and maintenance practices appear to be satisfactory. Site appears acceptable and is located in old spoil banks north and east of town.

Ashland, Lamedeer, Rosebud - These three disposal sites could all be lumped together and more properly be called open burning dumps. The sites appear to be acceptable, but operation and maintenance at the sitesare nonexistent.

Ingomar - It has been rumored that a disposal site exists in this area. I have not seen the site, but a reliable source indicates that it is also an open burning dump.

The Rosebud County Sanitarian and the County Commissioners are investigating the possibility of establishing a countywide solid waste program. The existing sites would be closed with the exception of Colstrip and Forsyth. In their place would go large bulk containers (40 cubic yard). If this idea were to materialize, Rosebud County would have an excellent solid waste disposal program.

Leachate is not a problem due to the limited amount of precipitation received in the area. Surface runoff due to intense thunderstorms may enter the active disposal area of a few sites, including those at Broadus and Hysham. Open burning is practiced at some of the sites.

The low population density of the area makes it difficult to operate a good sanitary landfill for a reasonable cost. A report by HD&R (1976), "Solid Waste Management Strategy", estimates that by 1980 the area will generate 77,000 lb/day of solid waste. They calculated that the minimum cost to

dispose of this waste would be $168,000 per year. Figure 1 and Table 1 provide additional information about this "least cost" alternative.

The Solid Waste Management Bureau is currently (1977) trying to force the communities to clean up their waste disposal sites by refusing to approve new subdivisions if the solid waste disposal site is not being operated properly. This should prevent the expansion of any problems, but will not correct any problems due to runoff from intense storms flowing through abandoned disposal sites.

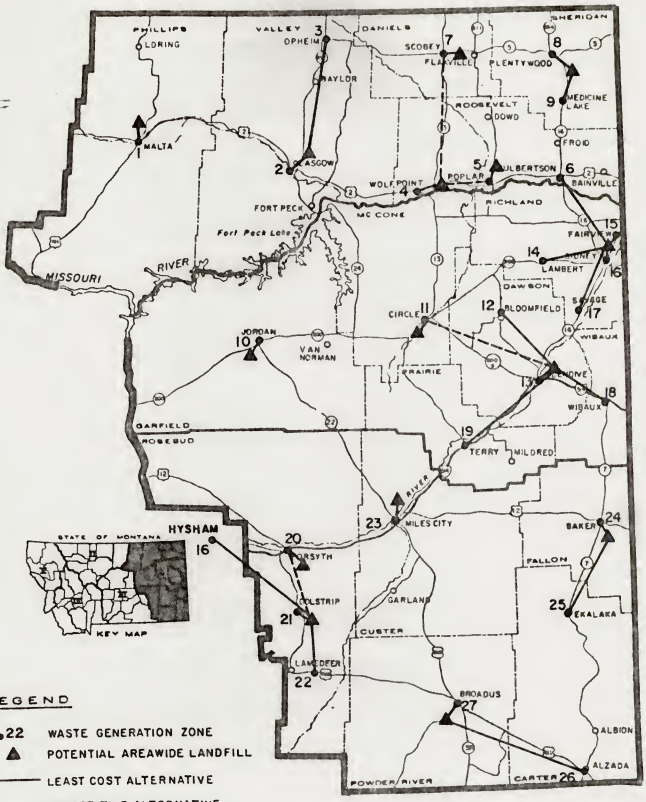


Figure 1. Least cost landfill alternatives.
(From HD&R, 1976.)

Areawide Landfill Location	Areawide Landfill Alternative: Contributing Waste Generation Zones	Quantity of Waste-1980 (Tons per year)	Annual System Cost
Malta	1-Malta	2,085	$29,150
Glasgow	2-Glasgow	8,941	$47,920
	3-Opheim	401	8,920
	Sub Total	9,342	$56,840
Wolf Point	4-Wolf Point	2,063	$16,460
	5-Poplar	1,566	24,990
	7-Scobey	1,472	30,690
	Sub Total	5,101	$72,140
Plentywood	8-Plentywood	1,576	$15,190
	9-Medicine Lake	694	11,100
	Sub Total	2,270	$26,290
Jordan	10-Jordan	696	$25,930
Glendive	11-Circle	1,174	$25,920
	12-Bloomfield	512	7,830
	13-Glendive	5,912	38,780
	18-Wibaux	431	7,250
	19-Terry	850	16,560
	Sub Total	8,879	$96,340
Sidney	6-Culbertson	558	$11,090
	14-Lambert	537	9,250
	15-Fairview	714	7,410
	16-Sidney	3,990	27,770
	17-Savage	438	5,710
	Sub Total	6,237	$61,230
Colstrip	16-Hysham	408	$10,440
	20-Forsyth	1,726	24,590
	21-Colstrip	985	6,080
	22-Lame Deer	1,194	17,320
	Sub Total	4,313	$58,440
Miles City	23-Miles City	6,666	$39,600
Baker	24-Baker	1,565	$23,280
	25-Ekalaka	390	12,470
	Sub Total	1,955	$35,750
Broadus	26-~~Albion~~ Alzada	219	$11,900
	27-Broadus	830	22,380
	Sub Total	1,049	$34,280
REGION TOTAL		48,593	$535,990

YTAPO Project Area

Table 1. Summary of least cost sanitary landfill alternatives for eastern Montana. (From HD&R, 1976)

AGRICULTURAL

Agricultural wastes have often been ommited from inventories of solid waste. Animal wastes, crop residue, and sawdust are seldom placed in the same category as household trash.

The volumes of "wastes" generated by agricultural are high, but often these wastes are put to beneficial use by the farmer or rancher genrating them.

Crude estimates for the project area indicate that the following amounts of "waste" are produced: on an annual basis:

Livestock -- 500,000 head x 3650 lb/head = 1,825,000,000 lb.

Residue from dryland farming --

320,000 acres x 4000 lb/acre = 1,280,000,000 lb.

Sawdust, residue from irrigated cropland, hay wasted by livestock, etc. are not included.

One agricultural waste disposal problem that might become more severe in the future is the disposal of dead animals. Currently most dead animals are allowed to decompose naturally, on the surface of the ground (or rendered). If social and legal pressures increase, the "proper" disposal of these animals will be quite expensive.

If agricultural wastes are handled properly (see section on feedlots*), the use of these wastes can be considered to be a wise approach to nutrient cycling. But, runoff into streams, nitrate contamination of the groundwater, etc. must be avoided.

Additional information on feedlots and on the use of residual wastes to control erosion is included in the Agricultural Report.

* YTAPO Ag. Report

ENERGY CONVERSION

Two energy conversion facilities are operational within the project area, Colstrip Units 1 & 2 and the MDU (Mont-Dakota Utilities) turbine unit at Miles City. The turbine unit will not be treated in detail. Also, since Western Energy has started the construction of Units 3 & 4 at Colstrip, these units will be treated as existing units.

Several coal gasification facilities and a MHD (Magneto-Hydro-Dynamics) plant have been proposed for the area. The residual wastes from these units will be treated in a general sense.

Colstrip Units 1 to 4.

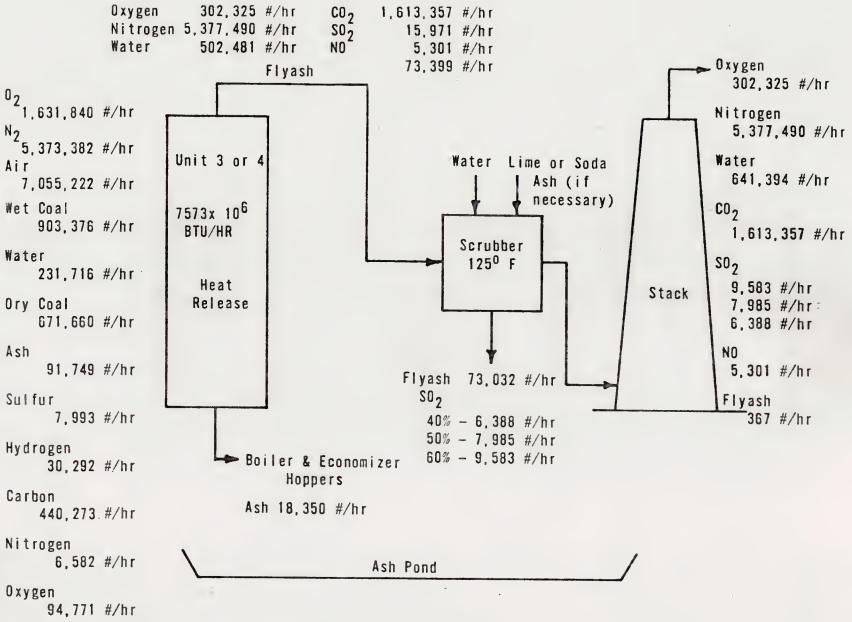
Data contained in the Draft EIS (1974) on Colstrip 3 & 4 and verified by a telephone conversation with Western Energy officials indicates that the four units (1 through 4) will produce approximately 1.2 million tons of ash and 0.2 million tons of scrubber residue per year (dry weight). Figures 6-12 from the State of Montana Draft EIS is reproduced on the next page. It gives the consumption and discharge from one unit (#3 or #4). The letters on the diagram refer to the columns of the table.

The primary concern is relative to the probability of:

1. Accidental or intential spills of raw chemicals of the ash or sludge.

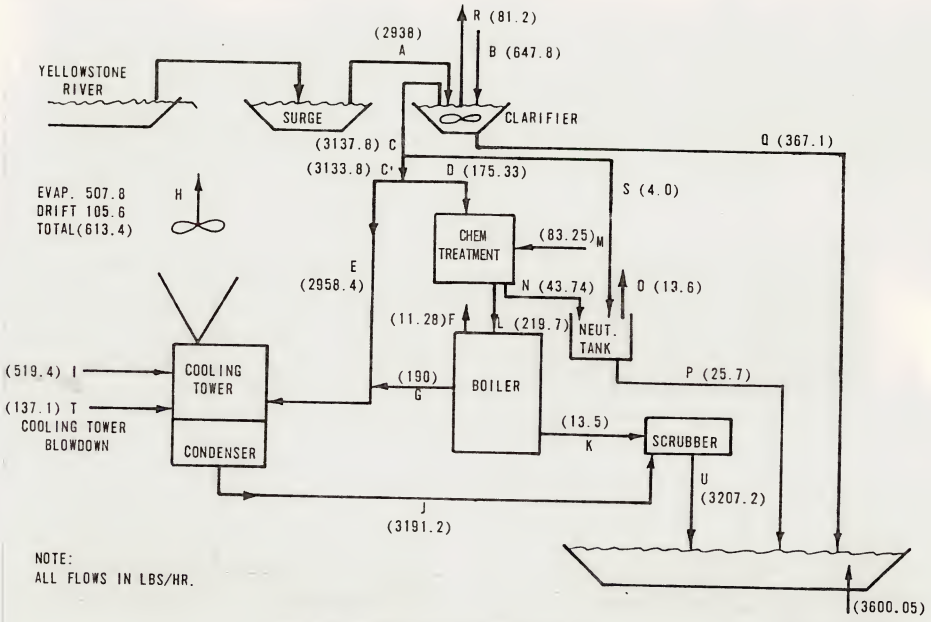
2. The probability of the "sealed retention ponds" used for disposal of the ash and sludge developing leaks.

(Additional information will be added when the Federal EIS is complete.)



Unit Coal Flow Diagram

FIGURE 6-12



CHEMICAL BALANCE FOR COLSTRIP #3 OR #4

FIGURE 6-13

TABLE 6-3

CHEMICAL BALANCE FOR UNIT #3 or #4

FLOWS IN LBS/HR

	A	B	C	C[1]	D	E	F	G	H	I
Ca	234.5		234.5	234.2	13.11	221.1		13.11	10.2	
Mg	78.5		78.5	78.4	4.4	74		4.4	3.4	
Na	229.4		229.4	229.1	12.82	216.3		29.7	10.6	
NH_3								.051	.051	
SO_4	683	86.65	770	769	43	726		108.2	57.7	499.6
Cl	36.7	1.42	38.13	38.1	2.1	36		2.4	2.55	19.6
HCO_3	764.6		676.8	675.9	37.8	638			16.1	
CO_2	621.8		540.6	539.9	30.2	509.7	11.28		507.8	
SiO_2	60.15		60.15	60.1	3.4	56.7		3.4	2.55	
PO_4								.081		
Suspended Solids	229.4									
Cl_2									2.44	
Alum		47.9								

TABLE 6-3 (Cont.)

FLOWS IN LBS/HR

	J	K	L	M	N	O	P	Q	R	S	T	U
Ca	224		13.11				.3			.3		224
Mg	7.5		4.4				.1			.1		75
Na	235.3		29.7	16.9			.29			.29		235.3
NH_3			.051	.051								
SO_4	1276.1		108.2	65.2			.95			.95		1276.1
Cl	55.45		2.4	.3			.04			.04		55.45
HCO_3	621.9	13.5	13.5		24.32		22	87.76		.84		635.4
CO_2	1.9		11.28		18.9	19.6	.7		81.2	.7		1.9
SiO_2	57.55		3.4				.05			.05		57.55
PO_4	.081		.081	.081								.081
Suspended Solids								229.4				
Cl_2	-2.44											
Alum				.49	.49		.49	47.9				

TABLE 6-3 (Cont.)

FLOWS IN LBS/HR

	A	B	C	C[1]	D	E	F	G	H	I
Polyelectrolyte		2.04								
FC		.032	.032	.031	.0017	.03		.093		.003
Cu		.032	.032	.031	.0017	.03		.024		.112
Zn								.01		.043
Sn								.0003		.0015
Cr										.0013
Ni		.003	.003		.0002	.0033		.0025		.0009
Mn								$1x10^{-6}$		
Mo								.001		.0019
CaO		509.7	509.7	509	28.5	480.5		28.5		
Na_2CO_3										
TOTAL	2938	647.8	3137.8	3133.8	175.33	2958.4	11.28	190	613.4	519.4

TABLE 6-3 (Cont.)

FLOWS IN LBS/HR

	J	K	L	M	N	O	P	Q	R	S	T	U
Polyelectrolyte				.051	.051		.051	2.04				
FC	.0093		.108	.091			.0013			.0013		.092
Cu	.166		.024	.022			$3x10^{-5}$			$3x10^{-5}$		.165
Zn	.053		.01	.01								.053
Sn	.0018		.0003	.0003								.0018
Cr	.002		.0008	.0008								.005
Ni	.00045		.00025	.00005			$3x10^{-6}$			$3x10^{-6}$		.00045
Mn	$1x10^{-6}$		$1x10^{-6}$	$1x10^{-6}$								$1x10^{-6}$
Mo	.0029		.001	.001								.003
CaO	538.1		28.5				.7			.7	29.1	538.1
Na_2CO_3	108										108	108
TOTAL	3191.2	13.5	219.7	83.25	43.74	19.6	25.7	367.1	81.2	4.0	137.1	3207.2

COAL GASIFICATION

The data currently available on gasification plants is summarized in the chapter devoted to Energy Conversion. Apparently the residual wastes will include those wastes common to a coal fired power generation plant plus additional ash and high solids condensate from the gasification process. Part of the waste will go to ash dewatering ponds and part of it to evaporation ponds. There is a possibility that the gasifier condensate sent to the evaporation ponds might be high in phenols and other organics.

MAGNETO-HYDRO-DYNAMICS

The best information available to date indicates that the residual waste from a MHD plant will be similar to that from a conventional coal fired generation plant.

MUNICIPAL SLUDGES

Sludges are often generated by municipal sewage treatment plants and water treatment plants. The sewage treatment plant sludge is the biologically degraded residue from the sewage solids. The sludge from the water treatment plant is the sediment that was settled out of the river water with the assistance of alum or other chemicals.

Projected 1978 Municipal Sludge Generation Water

	Pounds Per Day, Dry Weight		
Community	Water Treatment Plant Sediment	Aerobically Treated Sewage Sludge	Anaerobically Treated Sewage Sludge
Miles City		1,200	NA
Forsyth		350	NA
Colstrip	NA	200 to 500	NA
Ekalaka	NA	NA	100

The water treatment plant sediment is being disposed of locally by landfilling.

Ekalaka provides the dried sewage sludge to anyone wishing to use it for a soil conditioner.

Miles City, Forsyth, and Colstrip will be switching from lagoons to oxidation ditches for sewage treatment in 1978 and it is anticipated that the sludge will be dried and disposed of in a sanitary landfill.

RADIOACTIVE WASTES

The primary sources of radioactive wastes within the project area are hospitals and industrial users. No data is available on the industrial users, which are involved with well logging and materials testing. None of the radioactive materials they utilize are believed to be in a form that is susceptible to accidental spills.

The Holy Rosary and the Veterans Administration Hospitals in Miles City use limited amounts of radioactive materials for clinical purposes.

Holy Rosary Hospital:

A telephone communication with the laboratory indicates that they utilize approximately 1,000 µcuries of iodine and cobalt per year. No attempt is made to separate the residual radioactive materials from the central wastewater system.

A telephone conversation with the laboratory indicated that the laboratory uses between 500 and 1,000 µcuries or iodine and cobalt per year. No attempt is made to separate the residual radioactive wastes from the central sewer

system. Another telephone conversation with the Nuclear Medicine staff indicated that they utilize 100 millicuries of Technetium per week. This isotope is appparently delivered in the form of Mo^{99} on a regular weekly basis. The unused Tc^{99} is stored in a decay bin for six months before disposal via the sewer system. An unspecified quantity of I^{131} is also used. The residual iodine is held in the decay bin for one year before disposal. The method of disposal of contaminated human wastes was not specified, but is apparently via the central sewer system. The half-lives of the isotopes are:

I^{125} = 60 days	Mo^{99} = 66 hours
I^{131} = 8 days	Tc^{99} = 6 hours
Co^{57} = 271 days	

HAZARDOUS WASTES

Pesticides are utilized by most farmers, ranchers, county weed crews, utility maintenance crews, highway maintenance crews, power companies, etc. The disposal of small amounts of excess chemicals and the empty containers often presents a problem.

The State Solid Waste Bureau has collected most of the older, persistent pesticides. These pesticides are being stored in an old military bunker and the state has proposed to transfer them to a new landfill in the northwestern part of the project area.

The proposal to landfill the obsolete pesticides has met with considerable local resistance. Physical data on the site is not complete, but the data submitted by the state to our office as of 6-7-77 indicates that there are no basic problems with the site relative to water quality.

An on-site inspection by the YTAPO staff indicated that wet weather operations, surface drainage, and possibly groundwater may be a problem. Several drainageways that are incised to a depth of about

one foot cross the 20 acre site. Groundwater was found at approximately 15 feet below the surface, but due to the apparent high clay content of the parent material, any groundwater contamination may be very localized.

As of 6-7-77, the YTAPO does not oppose the establishment of the hazardous waste disposal site. But, the YTAPO recommends that the State use better professional judgement in future evaluations of the site and in operating the site if it is to be utilized. The YTAPO also recommends that a "perpetual fund" of approximately $100,000 be established to pay for the continued monitoring of the site and to be used for the reclamation of the site if the monitoring indicates there is a major problem.

Heavy metals, toxic organics, and similar compounds are not known to be utilized within the project area in quantities or situations that would cause them to be a solid waste disposal problem.

Petroleum products, crude and refined, are an occasional problem. There have been occasional spills of crude petroleum in the vacinity of the oil fields. The Cedar Creek anticline field seems to have been the prime offender in the past.

Sloppy procedures at construction and drilling sites may cause some problems. A YTAPO staff member found seven nearly intact sacks of chemicals (not highly toxic) when investigating a site where a gas well had been drilled. Drillers also habitually discharge waste lubricating oil, as well as any crude oil "show" to the "mud pits" which are eventually graded, leaving the oil in the soil. All wastes, tin cans to excess chemicals, are buried in a shallow pit on the drilling site.

Data on the surface discharges containing residual wastes is included in the Point Source Report. Data on subsurface discharges of wastes is included in the Groundwater Report.